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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: James D. Spurgeon

Serial No.: 09/732,391

Art Unit: 3676

Filed: December 7, 2000

Title: BELLOWS TYPE MECHANICAL SEAL

Examiner: Doug Hutton

Docket No.: 32040US1

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Commissioner for Patents
P.O. Box 1450
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APPELLANTS' BRIEF

Sir:

This brief is filed in support of the Notice of Appeal mailed May 14, 2003.

Pursuant to 37 CFR § 1.192, this brief is filed in triplicate and accompanied by the requisite fee under 37 CFR § 1.17(c) of \$160. A check for \$160 to cover the aforementioned fee is enclosed herewith. If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No. 32040US1.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 2313-1450, 20231 on the date indicated below.

Michael W. Garvey
Name of Attorney for Applicant(s)
07-16-2003
Date

Signature of Attorney

(1) REAL PARTY IN INTEREST

Infinity Manufacturing, Inc., a corporation of Georgia, is the owner of this application by assignment from the applicant.

(2) RELATED APPEALS AND INTERFERENCES

None.

(3) STATUS OF CLAIMS

Claims 3, 6, 8-11 and 15-17 have been cancelled by the amendment of November 18, 2002.

Claims 1, 2, 4, 5, 7, 12-14, and 18-24 remain finally rejected by an Office action of February 11, 2003 and are forthwith appealed to the Board of Patent Appeals and Interferences. Claim 4 was identified as rejected on the most recent Office Action Summary form (PTO-326), but the Examiner's final rejection did not state any grounds for the rejection of claim 4.

A clean copy of the claims presented for appeal are attached as the Appendix.

(4) STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final rejection of February 11, 2003.

(5) SUMMARY OF INVENTION

The present invention, as described in claim 1, is directed to a sealing system for a rotating machine (8) having a stationary element and a drive element (10) rotationally connected to the stationary element (16) (see Fig. 1 and page 3, lines 12-22). The sealing system includes a plate (24, 34) having a bearing surface (30, 40). The plate (24, 34) is rigidly connected to either the drive element (10) or the stationary element (16) (see page 4, lines 1-4, 10-12). The sealing system also includes a sealing assembly (17) having a resilient bellows (18) and a bearing surface (28, 38) (see page 3, lines 22-26). The bellows (18) provides a force (48), forcing the bearing surface (28, 38) of the sealing assembly (17) against the bearing surface (30, 40) of the plate (24, 34) to form a dynamic seal (32, 42) (see page 5, lines 3-10). The resilient bellows (18) comprises a plurality of corrugations and an inwardly tapered collar (50, 52) to which the thrust plate (20, 22) is secured (see Fig. 2 and page 5, lines 5-8, 18-21).

According to a further aspect of the invention, the sealing assembly (17) includes a thrust plate (20, 22) secured to the collar (50, 52) of the resilient bellows (18), where said thrust plate (20, 22) provides the bearing surface (28, 38) of the sealing assembly (17). Further, claim 4 describes the sealing assembly (17) as having a static sealing element disposed within a gap (54, 56) provided between the collar (50, 52) and the thrust plate (20, 22) (see page 5, lines 21-28).

According to yet another aspect of the invention, claim 24 defines a method for forming a resilient bellows (18) for the aforementioned sealing system, in which a bellows (18) is formed with a corrugated hollow body, and an end of the body is folded inwardly to form a collar (50, 52) for receiving a plate (20, 22) (see page 5, lines 11-21).

(6) ISSUES

(A) Whether claims 1, 2, 5, 12-14, and 18-24 are patentable under 35 U.S.C. 103(a) over U.S. Patent No. 3,560,004 to Donley et al. (hereinafter Donley), in view of U.S. Patent No. 2,464,136 to Jenkins (hereinafter Jenkins). Specifically, whether a teaching of the use of a corrugated bellows sealing component in the Jenkins patent renders it obvious to modify a sealing assembly comprising a tapered annular support member in the Donley patent to incorporate the use of a corrugated bellows with tapered collar, as in the present invention. Additionally, with regard to claim 24, whether teaching a mechanical seal around a rotating shaft in the Donley patent and the corrugated bellows in the Jenkins patent suggest a method for forming a resilient bellows comprising the step of folding an end of the corrugated hollow body inwardly to form a collar.

(B) Whether claim 7 is patentable under 35 U.S.C. 103(a) over Donley in view of Jenkins, and in further view of U.S. Patent No. 3,601,413 to Darnell (hereinafter Darnell). Specifically, whether a teaching of the use of a corrugated bellows sealing component in Jenkins patent renders it obvious to modify a sealing assembly comprising a tapered annular support member in Donley to incorporate the use of a corrugated bellows with tapered collar, as in the present invention.

(C) As previously noted, the Examiner's final rejection did not state any grounds for the rejection of claim 4. The following arguments will be based on the assumption that claim 4 has been rejected on the same grounds as those in issue (A), and will consider the issue of whether claim 4 is patentable under 35 U.S.C. §103(a) over Donley in view of the Jenkins patent. Specifically, whether teaching a tapered annular support member with the tapered surface

assembled flush against the mating surface of a sealing ring suggests the inclusion of a gap provided between the collar and thrust plate in which to dispose a static sealing element, such as a gasket, as in the present invention.

(7) GROUPING OF CLAIMS

For the purposes of this appeal, the claims have been divided into three groups:

Group I consists of claims 1, 2, 5, 7, 12-14, and 18-23;

Group II consists of claim 4; and

Group III consists of claim 24.

(8) ARGUMENT

The rejections under appeal in the present case are each made under 35 U.S.C. § 103(a)... When combining or modifying references under § 103(a), an Examiner must establish a *prima facie* case of obviousness or the rejection will be overturned. See *In re Rinehart*, 189 USPQ 143 (CCPA 1976); *In re Linter*, 173 USPQ 560 (CCPA 1972); *In re Saunders*, 170 USPQ 213 (CCPA 1971); *In re Tiffin*, 170 USPQ 88 (CCPA 1971), *amended*, 171 USPQ 294 (CCPA 1971); *In re Warner*, 154 USPQ 173 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968). The seminal case of *Graham v. John Deere Co.*, 383 U.S. 1, illuminates three steps or factual inquiries that an Examiner must engage in to establish such a *prima facie* case of obviousness. According to *Graham*, the examiner must: (1) set forth each of the differences between the claim and the reference(s) sought to be combined or modified; (2) set forth the proposed modification; and (3) explain why the proposed modification is obvious. 383 U.S. at 17. The case of *In re Jones*

further explained that the third step in *Graham* amounts to a showing of some suggestion or motivation in the prior art that would lead one of ordinary skill in the art to pursue the proposed modification. 21 USPQ.2d 1941, 1943 (Fed. Cir. 1992); see also *In re Vaeck*, 20 USPQ.2d 1438 (Fed. Cir. 1991). In the case of *In re Fritch*, the Court established that the prior art must have suggested the desirability of the modification. 23 USPQ.2d 1780 (Fed. Cir. 1992). It has also recently become apparent that the required suggestion or motivation in the prior art must be clear and particular. *In re Dembiscak*, 175 F.3d 994, 999 (Fed. Cir. 1999).

Having set forth the appropriate standard for establishing obviousness, the specific rejections are discussed hereinafter.

GROUP I: Claims 1, 2, 5, 7, 12-14, and 18-23

Claim 1: The Donley patent fails to suggest the use of a bellows having a plurality of corrugations.

The Examiner has rejected claim 1 under 35 U.S.C. § 103(a) over the Donley patent in view of the Jenkins patent. Appellant submits that, in view of 35 U.S.C. § 103(a) and pertinent case law, the Examiner has not established a *prima facie* case of obviousness in rejecting these

claims. Specifically, the Examiner has not presented any evidence that the Donley patent suggests the desirability of a modification of the assembly to include the type of bellows component described in the Appellant's specification and disclosed in the Jenkins patent.

Further, the Examiner has failed to meet the burden of explaining why a modification of the bellows described in the Jenkins patent to include an inwardly tapered collar was desirable or obvious at the time the present invention was made. The Examiner merely states that these

Donley is the
base ref

✓ good point
I only used
Jenkins to
support alt.
notice.

I didn't
do this

modifications would have been obvious, but does not state what motivation or suggestion he is relying on, and therefore fails to meet the requirement set forth in *Graham*.

So what?
Donley discloses
tapered collars

Claim 1: The Jenkins patent teaches away from the use of a tapered collar on the corrugated bellows.

In addition to the failure to establish the obviousness of modifying the mechanical seal in the Donley patent to use the bellows from the Jenkins patent, the Examiner fails to present any suggestion arising from the prior art to modify the bellows described in the Jenkins patent to include a tapered end collar that extends inwardly from an end of the bellows, as described in claim 1. Furthermore, the Jenkins patent teaches away from such a tapered collar. The Jenkins patent describes as an object of the invention that the ends of the bellows be "fixed ... by means of elastic members, such as rubber rings" (column 1, lines 25-29). The Jenkins patent further asserts that "the effectiveness of the seal depends upon proper fit" between the bellows and mating rubber seal rings (column 2, line 75 – column 3, line 6). By emphasizing the indispensability of an elastic seal, the Jenkins patent effectively teaches away from a

modification of the bellows ends to provide the inward taper described in claim 1. Also, since the Donley patent discloses a tapered condition on the annular support member component, as relied upon in the Examiner's finding of obviousness, the conflicting bellows end geometry described in the Jenkins patent further suggests that a combination of the two designs is nonobvious. Since it is improper to combine references where the references teach away from their combination, *In re Grasselli*, 218 USPQ 769, 779 (Fed. Cir. 1983), the rejection relying upon such a combination must be found to be improper.

✓
- not trying
to combine
the ends of
the refs;
Jenkins is
used only
to teach
plurality
of bellows

The mere fact that the Appellant's bellows design described in claim 1 could be derived by combining the corrugated bellows component in the Jenkins patent with the inward taper of the annular support members of patent Donley will not by itself support a *prima facie* case of obviousness. As indicated in *In re Mills*, 16 USPQ.2d 1430 (Fed. Cir. 1990), the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In the present case, the desirability of the bellows collar modification is found only in the Appellant's own disclosure; therefore, the Examiner's case for *prima facie* obviousness must fail.

For the above reasons, claims 1, 2, 5, 7, 12-14, and 18-23 are patentable, because the prior art of record does not teach or suggest the use of a bellows sealing component have an inwardly tapered collar.

GROUP II: Claim 4

Claim 4: Neither Donley nor Jenkins teaches the inclusion of a gap between the bellows collar and the thrust plate.

Since the Examiner's final rejection failed to indicate any grounds for the rejection of claim 4, the Examiner has clearly established no *prima facie* case of obviousness for this claim. However, for the purpose of the argument that follows, it is assumed that claim 4 has been considered and rejected on the same grounds as that of claim 1. (Claim 4 had been rejected on these grounds in Office Action paper no. 8 prior to the claim's amendment.) Appellant considers claim 4 to be patentable over the prior art for the above reasons, as well as for reasons stated below. Therefore, claim 4 is considered to be patentable separately from claim 1.

In claim 4, it is required that a gap be provided between the collar and the thrust plate in which a static sealing element is disposed. In contrast, the tapered condition of the inner side walls of the annular support members of the Donley patent provides surfaces that “ride upon” (Donley patent, Column 3, lines 20-22), or are flush with, the sealing rings with which the annular support members contact, providing no gap between the contacting components. Therefore, the internal walls of the annular support members of the Donley patent do not teach or suggest the provision of a gap between the bellows collar and the thrust plate, as described in claim 4. Likewise, the corrugated bellows component described in the Jenkins patent does not include a gap between the end of the bellows and its mating seal components. As discussed above, the Jenkins patent specification expresses the importance of a proper fit between the bellows and mating rubber seal rings, which teaches away from providing a gap between the contacting surfaces of the bellows and its respective mating seal component. Therefore, even if the Donley and Jenkins patents were combined, despite the lack of motivation to do so, this combination would not disclose the limitation of a gap provided between the bellows collar and the thrust plate. As with the rejection of the group 1 claims, the Examiner has failed to produce a motivation or suggestion from the prior art that would render obvious the inclusion of the aforementioned gap.

For these reasons, claim 4 is patentable independently of any patentability in claim 1. Further, regarding claim 4, it is submitted that the Examiner has not established a *prima facie* case of obviousness as required by *Graham*, and thus the rejection is improper.

GROUP III: Claim 24

Claim 24: Neither Donley nor Jenkins teaches a method for forming a corrugated bellows with inwardly folded end collar.

Claim 24 has been rejected for identical grounds to that of claim 1, as set forth in Issue A, involving the Donley and Jenkins patents. Appellant considers claim 24 to be patentable over the prior art for the reasons explained under Group I, as well as for reasons stated below. Therefore, claim 24 is considered to be patentable separately from claim 1.

With regard to claim 24, the Examiner insists that the prior art references (the Donley patent and the Jenkins patent) when combined teach a method for forming a resilient bellows sealing component by (1) forming a bellows having a corrugated hollow body, and (2) folding an end of the body inwardly to form a collar for receiving a plate (Office Action, paper no. 11, page 7). Appellant contends that the claimed method is not taught or suggested by the prior art, as neither patent discusses a method of forming a corrugated bellows component with a tapered end collar as required by claim 24.

The Donley patent provides for the use of a sealing assembly comprising two annular support members and two spring members. The Donley patent indicates that these components “overlapped and are resistant welded to each other” to form the mechanical seal (Donley patent, Column 3, line 17). While this arguably discloses a method of forming a bellows, it clearly does not disclose a method of forming a bellows having a corrugated body, where “corrugate” is defined as “to shape into folds or parallel and alternating ridges and grooves.” The American Heritage Dictionary of the English Language (4th Ed. 2000). The Examiner fails to explain how a reference describing an assembly consisting of spring and support components can disclose a

method of forming a corrugated bellows. Further, while a taper is depicted on the annular support members in the Donley patent, which make up the ends of the welded mechanical seal, nowhere in the Donley patent is the manner of forming this taper disclosed.

Although the Jenkins patent discloses the use of a corrugated bellows sealing component, the patent does not disclose a method of forming said bellows. Further, as discussed above with regard to Group I, the Jenkins patent does not disclose or suggest a bellows having an inwardly tapered collar. Therefore, the step of folding an end of the body inwardly to form a collar for receiving a plate could not be disclosed or suggested by the Jenkins patent.

As with the Group I claims, the Examiner presented no suggestion or motivation to combine the Donley and Jenkins patents in an effort to produce a method of forming a bellows having both corrugations and a tapered collar. Thus, the suggestion or motivation required for a *prima facie* case of obviousness has not been met, and the Examiner's rejection must fail.

Additionally, even if the references were combined as proposed by the Examiner, all of the limitations of the claim would not be taught or suggested, since neither the Donley patent nor the Jenkins patent disclose or suggest either a method of forming a corrugated bellows or a method of folding the end of a bellows component inward to form a collar.

CONCLUSION

With regard to each of Examiner's rejections under 35 U.S.C. §103(a), a *prima facie* case of obviousness has not been made. In essence, the Examiner has rejected each of Appellants' claims on the grounds that it would be obvious to combine the sealing assembly of the Donley patent, which utilizes welded annular springs and support members sealing against thrust plates,

with the corrugated bellows used in the Jenkins patent. These rejections are flawed for two reasons. First, the Examiner provides no support for the conclusion that this combination was obvious at the time the invention was made. More specifically, the Examiner presents no evidence from the prior art referenced (the Donley and Jenkins patents) that would lead one of ordinary skill in the art to pursue the proposed modification. Second, since a primary object of the Jenkins patent is to provide a bellows seal in which the ends are fixed by means of elastic members, it would not be obvious to combine the sealing mechanism in the Jenkins patent with the sealing assembly described in the Donley patent, where the tapered support members “ride upon” the mating thrust plates. As discussed above, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 16 USPQ.2d 1430 (Fed. Cir. 1990). The Examiner repeatedly asserts that the proposed modifications were obvious at the time of the invention; however, no support for that conclusion, in the form of a suggestion or motivation in the prior art, is provided.

None of the cited references teach or suggest either the use of a bellows having a tapered end collar or the method for forming such a bellows. The Donley patent does not teach or suggest the use of a bellows having a plurality of corrugations, as recited in Appellant’s claims. Further, it has been shown that the Jenkins patent effectively teaches away from inclusion of a tapered collar at the end of the bellows, as it relies on the use of elastic rubber ring sealing members to provide a seal.

There must be a showing in the prior art sought to be combined or modified that would provide motivation to one of ordinary skill in the art to make the proposed modification at the

time of the invention. That showing must be "clear and particular" and the prior art must suggest the "desirability" of making such a combination. The Examiner has failed to make any such showing.

For the aforesaid reasons, it is respectfully submitted that the Examiner has not established a *prima facie* case of obviousness in making each of the appealed rejections. Therefore, it is hereby requested that each of Examiner's rejections be reversed.

Respectfully submitted,

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(9) APPENDIX

1 1. A sealing system for a rotating machine having a stationary element and a drive
2 element rotationally connected to said stationary element, the sealing system comprising:
3 a plate comprising a bearing surface, the plate for connecting to one of said drive element
4 and said stationary element; and
5 a sealing assembly comprising a resilient bellows and a bearing surface, the bellows
6 having a plurality of corrugations and a tapered collar extending inwardly from an end of the
7 bellows, and the bellows providing a force which causes the bearing surface of the sealing
8 assembly to bear on the bearing surface of the plate to form a dynamic seal.

1 2. The sealing system of claim 1, wherein the sealing assembly further comprises a thrust
2 plate attached to the collar, and wherein the thrust plate provides said bearing surface of the
3 sealing assembly.

1 4. The sealing system of claim 2, wherein the sealing assembly further comprises a static
2 sealing element, the static sealing element being disposed within a gap provided between the
3 collar and the thrust plate.

1 5. The sealing system of claim 1, further comprising a mounting element for connecting
2 said plate to said one of said drive and stationary elements.
3
4

1 7. The sealing system of claim 1, wherein said plate comprises graphite which provides a
2 sealing and lubricating layer to the dynamic seal.

1
2 12. The sealing system of claim 1, further comprising a seal chamber which at least
3 partially encloses said sealing assembly.

4
1 13. The sealing system of claim 12, wherein the seal chamber is defined by the stationary
2 element.

3
1 14. The sealing system of claim 12, further comprising a seal gland which closes an area
2 of the seal chamber.

3
1 18. A resilient bellows for a sealing system in a rotating machine having a stationary
2 element and a drive element rotationally connected to said stationary element, the resilient
3 bellows comprising:

4 a hollow body;

5 a plurality of corrugations in the body; and

6 a tapered collar extended inwardly from an end of the body for receiving a plate.

7
8 19. The resilient bellows of claim 18, wherein the tapered collar comprises an inwardly
9 turned edge of the body.

1 20. The resilient bellows of claim 18, wherein the tapered collar has a frustoconical
2 shape.

1 21. The resilient bellows of claim 18, further comprising a sealing structure disposed at
2 the tapered collar for statically sealing the plate to the bellows.

1 22. The resilient bellows of claim 21, wherein the sealing structure comprises a gasket.

1 23. The resilient bellows of claim 21, wherein the sealing structure comprises a sealant.

1 24. A method for forming a resilient bellows for a sealing system in a rotating machine
2 having a stationary element and a drive element rotationally connected to said stationary element,
3 the method comprising steps of:

4 forming a bellows having a corrugated hollow body; and

5 folding an end of the body inwardly to form a collar for receiving a plate.